

COMPLEX SIGNAL DECOMPOSITION AND MODELING

ABSTRACT OF THE DISCLOSURE

A system, method and program product for monitoring a complex
5 signal for ultrasensitive detection of state changes, or for signature recognition and
classification is provided. A complex signal is decomposed periodically for
empirical modeling. Wavelet analysis, frequency band filtering or other methods
may be used to decompose the complex signal into components. A library of
signature data may be referenced for selection of a recognized signature in the
10 decomposed complex signal. The recognized signature may indicate data being
carried in the complex signal. Estimated signal data may be generated for
determination of an operational state of a monitored process or machine using a
statistical hypothesis test with reference to the decomposed input signal.